Effectiveness Monitoring Committee

Initial Concept Proposal

Deadline: 5:00 pm PDT September 14, 2022

Date Submitted: 14 September 2022

Project Title: Aquatic Toxicity and Cumulative Watershed Effects of Pesticide Discharge Related to Post-Fire Reforestation

Project # (to be assigned by EMC): Note: project duration is March 2023 - June 2025

Principal Investigator(s), Affiliation(s), and Contact Information (email, phone): <REDACTED> Department of Civil & Environmental Engineering, UC Davis, <REDACTED>

Collaborator(s) and Affiliation(s): <REDACTED>, Hydrologist, U.S. Geological Survey
<REDACTED>, Hydrologist, U.S. Geological Survey
<REDACTED>, Research Chemist, U.S. Geological Survey

Research Theme(s), Critical Monitoring Question(s), and Rules or Regulations Addressed.

• Critical Question: 5 (b) Are the FPRs and associated regulations effective in maintaining and restoring the distribution of foraging, rearing and spawning habitat for anadromous salmonids? Applicable Themes:1 (WLPZ Riparian Function), 2 (Watercourse Channel Sediment), and 5 (Fish Habitat).
• FPRs Addressed: Technical Rule Addendum #2 Cumulative Impacts Assessment Guidelines, d. Chemical Contamination Effects. 14 CCR § 916.4 Watercourse and Lake Protection. 14 CCR § 916.9 Protection and Restoration of the Beneficial Functions of the Riparian Zone in Watersheds with Listed Anadromous Salmonids.

Project Duration and Dates (MM/YY - MM/YY): 23-25

Estimated Funds Requested for Project: Please provide the total amount of funding requested from the EMC, broken down by year of expenditure, with a brief justification of costs not to exceed 200 words.

- ☐ **< $10,000**
- ☐ **$10,000 - $25,000**
- ☐ **$25,000 - $75,000**
- ☐ **$75,000 - $150,000**
- ☑ **> $150,000**

Total $300,000; FY 2022/2023 ($30,000) Funding will be used

Project Description: *In not more than 2,000 words*, describe the project, including (1) Background and Justification, (2) Research Question(s), including Objective and Scope, (3) description of Research Methods, (4) Scientific Uncertainty and Geographic Applicability, including identified monitoring location(s), and (5) a description of the roles of Collaborators and Project Feasibility.

(1) Background and Justification

The recent surge in catastrophic wildfires has increased forest regeneration efforts on lands throughout California, and the use of herbicides to ensure seedling survival has increased at a similar scale. Federal Law requires any person who applies or supervises the use of restricted use pesticides to be certified as a Licensed Pest Control Applicator (PCA) and to develop site specific mitigations. Mitigations specified by the individual landowners are often implemented in addition to the site-specific mitigations developed by the PCA. It is not clear if the current regulatory framework or implemented mitigations adequately protect the beneficial uses of waters of the state when applied over large burned areas. The Central Valley Regional Water Quality Control Board's General Order for timberland management activities was modified in 2017 to include provisions beyond those currently required under the California Forest Practice Rules (FPRs) or enacted by the California Department of Pesticide Regulation aimed to protect waters of the state from problems related to pesticide applications in forestry.

There are currently no requirements in the FPRs to address increased pesticide use following post fire salvage logging on Substantially Damaged Timber Harvest Plans and Emergency Notices. FPRs provide no management practices directed toward mitigating the potential impacts from direct application or run-off from pesticide treatments. The current lack of specific pesticide-related regulations in the FPRs has the potential to impact salmonid spawning and rearing habitats (916.4 & 916.9) or result in cumulative watershed effects in post-fire environments (916.9(b), TRA #2).

One-liter grab sampling is currently the accepted method for determining the concentrations of pesticides in surface waters. However, the discrete timing of the grab sample may not capture longer duration pesticide concentration dynamics that arise following episodic storms or pesticide applications. To assess cumulative watershed effects and potential toxicity, it is imperative to capture episodic events to determine if there are periods of exposure potentially impacting the function of the Watercourse and Lake Protection Zones (WLPZ) and its ability to support and provide spawning and rearing habitat for salmonids. Passive Sampling and Active Sampling are two evolving methodologies that can mitigate some of the limitations of 1-liter grab sampling.

(2) Research Questions, Objectives and Scope

The goal of the proposed project is to determine if existing FPRs provide adequate protection for waterbodies impacted by post-fire management practices with respect to pesticide applications. In order to begin to make this assessment, the presence or concentration of pesticides in affected watersheds must be measured. This project will attempt to provide land managers and regulatory agencies with a baseline understanding of the fate of herbicides in post-fire watersheds as well provide guidance on how to monitor waterbodies most efficiently in future investigations. The three specific objectives of this project are to: 1) compare passive, active, and traditional grab sampling techniques in post-fire watersheds to assess strengths and weaknesses such as cost effectiveness, ability to capture episodic events, and deployment issues, 2) compare data from passive and active sampling to grab sampling to better understand the concentration results and how those may relate to regulatory thresholds and forest-management practices, and 3) use the results for a range of common herbicides with varied physical-chemical parameters to develop recommendations regarding compound applicability of the varied active and passive sampling methods examined in the study.

Sampling for the project would take place between summer 2023 and winter 2024, and sample analysis and reporting would take place between winter 2024 and summer 2025